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Economic and Social Impacts of Non-traditional Export Crop Production in Highland Guatemala: Impact Perception Survey

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This study presents results of a household survey conducted in a small-scale farming community in highland Guatemala. The purpose of the survey was to measure local perceptions of the long-term social and economic effects of nontraditional agricultural export (NTAE) production at the household and community levels. This research is a component of the Integrated Pest Management Collaborative Research Support Program (IPM CRSP) for Central America. The primary objectives of the IPM CRSP/Central America are to identify and analyze the technical, social, economic, political, and institutional factors affecting pest management and food safety and to enhance counter-seasonal trade opportunities for NTAE crops (see Julian, Sánchez, and Sullivan, Journal of International Food and Agribusiness Marketing 11 (4): 2000).

The survey was undertaken in an effort to address contradictions between findings of IPM CRSP research and those of earlier studies. A growing body of literature has documented nonsustainable production and marketing constraints faced by small-scale producers of snow peas, broccoli, and other NTAEs in the Guatemala highlands and elsewhere in Central America. Nonsustainable soil degradation and other environmental problems, health costs, and social displacements have also been widely associated with NTAE production. Most of these studies are based on data collected in the 1980s and early 1990s. The IPM CRSP has addressed production and marketing constraints and pesticide-related environmental degradation since

1994. Recent IPM CRSP household socioeconomic data (Asturias et al. 1999) suggested that small-scale producers had attained greater benefits from NTAE production than reported in much of the earlier literature. The research results reported in this paper provide additional evidence in the form of household production histories the perceptions of both NTAE producers and nonproducers concerning the economic and social impacts of NTAE production for their families and community.

Economic, Social, and Environmental Factors: Overview

Small-scale producers began growing NTAEs some twenty to thirty years ago in Central America. Since that time, a plethora of studies has addressed the issue of whether small-scale production can sustainably increase the incomes and the quality of life for producers, their families, and communities through on-farm production and employment, processing, and other forward and backward linkages. While NTAE production has been dominated by large-scale operations in much of Latin America, small-scale producers dominate production in the Central Guatemalan highlands (Carter, Barham and Mesbah 1996). In this region both climate and the availability of family labor whose opportunity costs are very low contribute to a favorable prospect for the small-scale production of snow peas, broccoli, and other nontraditional fruit and vegetable crops. Given perfect factor and commodity market conditions, initial technical assistance and facilitated access to credit and market outlets, and the initial presence of the long-term social and cultural capital that has been shown to facilitate the success of small-scale production and marketing organizations, small-scale production of NTAEs should provide farmers with the highest value production on very small holdings. During the early years of small-scale NTAE production, adopters of these crops were able to increase family incomes; off-farm employment in packing plants and other operations also dramatically increased (von Braun

and Immink 1989). At the macro level, small-scale production of NTAEs contributed significantly to export earnings (Thrupp, Bergeron and Waters 1995). Over the course of this period, however, a number of studies have reported myriad market failures and environmental problems that threaten the sustainability of NTAE production in the small-scale sector and the potential of NTAE production to alleviate poverty in Guatemala and elsewhere in Central America.

Most of the studies challenging the sustainability of NTAE production by small-scale producers concentrate on market failures that have not been alleviated by national and international development programs. In some areas, farmers with very little land have achieved sufficiently high incomes per area planted to NTAE crops to permit the purchase of additional land from larger-scale producers (Carter and Mesbah 1993; Carletto, deJanvry and Sadoulet 1999). However, the long-term sustainability of growth in the small-scale NTAE sector is threatened by increasing price uncertainty in maturing niche markets and U.S. rejection of produce with pest or pesticide-residue contamination (Thrupp, Bergeron and Waters 1995; Conroy, Murray and Rosset 1996; Carter, Barham, and Mesbah 1996). Further, soil depletion associated with rising land pressure in imperfect markets and nonsustainable agrochemical use limits the potential of NTAE production to contribute to sustainably increasing incomes (Carletto, de Janvry, and Sadoulet 1999). Nonsustainably high levels of agrochemical use in the small-scale NTAE sector have resulted in the all-too-familiar "pesticide-treadmill" effect that decreases crop yield and product quality, as well as in increasing soil toxicity (Thrupp, Bergeron and Waters 1995).

Among these constraints, the misuse of agrochemicals has the most serious economic, environmental, and human health costs (Thrupp, Bergeron and Waters 1995; Arbona 1998;

Murray and Taylor 2000). The USAID-funded IPM CRSP, together with the Guatemalan Ministries of Agriculture and Finance and the U.S. Department of Agriculture Foreign Agricultural Service (USDAFAS) Guatemala, has carried out research demonstrating that snow peas can be produced with lower costs, higher yields, and improved quality by decreasing reliance on chemical pesticides and instituting integrated pest management practices (Julian, Sullivan and Sánchez 2000). Pre-inspection protocols were developed that would dramatically reduce the proportion of snow pea production that is lost to detentions and rejections at ports-of-entry due to sanitary and phytosanitary violations (Sánchez et al. 1998). However, the limited availability of information on good production management practices and producer training constrain the adoption of production and postharvest technologies that lead to more sustainable economic and environmental benefits at the producer level and throughout the production-processing-marketing value chain (Sánchez et al. 1998). Small-scale producers who are affiliated with cooperatives or who market products directly through contracts with exporters are most likely to have access to the information and technology that protect against crop loss and product rejection (Julian, Sullivan and Sánchez 2000).

Capital and risk constraints are key factors that underlie the small-farm adoption ceiling identified by Bradford Barham and Michael Carter and colleagues (Barham, Carter, and Sigelko 1995) and also by Joachim von Braun, Maarten Immink and colleagues (von Braun, Hotchkiss and Immink 1989; Immink and Alarcon 1993). In contrast to large-scale producers who plant up to 100% of their land to NTAEs, producers with less than four hectares are likely to plant only around one-third hectare to these high-value crops. Small-scale producers are constrained by lack of both production credit and the need to self-insure against stochastic shocks such as catastrophic crop losses and price drops. These producers self-insure by diversifying their crop

mix to include less-remunerative crops destined for domestic and other Central American markets and by growing basic foodstuffs whose expected return is only a fraction of the value of NTAE production (von Braun, Hotchkiss and Immink 1989; Immink and Alarcon 1993). While recent research has demonstrated that many small-scale producers are not constrained with respect to formal credit (Johnson 2001), studies based in the central highlands of Guatemala consistently find that low-income producers are credit-constrained and could benefit from decentralized, market-based credit unions and other forms of production-credit associations (Barham, Boucher and Carter 1996; Immink and Alarcon 1993). Small-scale farmers' critical need for insurance can be addressed through provision of crop insurance (Carter and Coles 1998) and through loan default insurance (Carletto 1999) and other forms of ex-post access to capital that enable farmers to leverage borrowing (Carter and Mesbah 1993).

The potential for the production of high-value export crops to alleviate poverty and enable social mobility through sustainably increasing production in the small-scale sector may also be constrained by land tenure structures that mitigate against a supply of land for purchase or rental, even if producers are economically motivated to buy land and do realize sufficient returns to purchase or rent additional land. While small-scale producers have been able to increase holdings through purchase from larger farms -- thus broadening the distribution and potential sustainability of NTAE production--underlying agrarian political and economic structures continue to favor large growers (Carter and Barham 1996).

Fortunately, small-scale producers are possessed of important assets that can counter these constraints. Perhaps surprisingly, the availability of family labor may not be the most viable of these assets. While underdeveloped rural labor markets do lower the opportunity costs of family labor, this is a false economy in the sense that a better form of rural development

would be to improve educational and employment opportunities in rural areas as a means of raising incomes and decreasing emigration. Thus the presence of unpaid or relatively inexpensive local labor is not an unmixed blessing, even to producer families. However, local people in many Maya communities in Chimaltenango and Sacatepéquez possess two additional assets that are not so contradictory: high levels of social capital and parallel marketing experience outside the NTAE sector.

Recent research in Chimaltenango suggests that both men and women have been able to leverage marketing experience in the textile and regional agricultural markets to maintain control of their means of production while participating in international markets (Hamilton, Asturias, and Tevalán 1999; Hamilton 2000; Hamilton et al. 2000; Fischer 2001). Edward Fischer found that small-scale NTAE producers in Chimaltenango have accumulated productive resources sufficient to achieve significant social mobility. Fischer attributed these economic gains to a trickle-down effect of sub-contracted production that has allowed small-scale producers to retain control of their means of production and has produced an upwardly mobile class of Maya farmers with sufficient resources to pursue long-term socio-economic gains (Fischer 2001). Critics of global capitalism, who lament the fact that NTAE production increases the distance between the wealthiest and the poorest indigenous people, ignore the more important phenomenon that Fischer's work illustrates: NTAE production decreases the distance between indigenous producers/entrepreneurs and the Ladino rural upper class.

Social capital arising from deeply embedded social norms and cultural values has been well documented among Maya communities in the Guatemalan highlands (Katz 2000) and comparable indigenous groups elsewhere in Latin America (Hamilton 1998; Fox 1996; Bebbington 1993, 1999). A wide variety of producer organizations has been

able to capitalize on many generations of normalized economic reciprocity and high levels of trust—qualities that have been identified as essential for enabling credit unions and other associations to relieve production and marketing constraints (Petty and Ward 2001; Uphoff and Wijayaratna 2000; Bebbington 1999; Barham, Boucher and Carter 1996).

Given both the social and economic asset bases of small-scale producers and the structural constraints to individual accumulation, the importance of production and marketing organizational structures that allow small-scale producers to increase production through both ex ante and ex post access to capital and to capitalize on traditional forms of social and economic collaboration cannot be overemphasized. Recommendations for organizational structures that allow vertical integration of production, processing, and marketing are particularly well targeted to the Guatemalan central highlands (Immink and Alarcon 1993).

Research Setting

The Impact Perception Survey was instituted in San Mateo Milpas Altas, Sacatepéquez in August of 2000. San Mateo was chosen for this study because it is located near the Quatro Pinos Cooperative (see von Braun, Hotchkiss and Immink 1989; Thrupp, Bergeron and Waters 1995) and many producers have been affiliated with the cooperative. NTAEs were introduced in San Mateo in 1980.[1] Patterns of land tenure and the proportion of household lands planted to NTAEs were consistent with earlier studies from the central highlands (Barham, Carter, and Sigelko 1995). Most farmers had holdings of less than one hectare and planted less than one-fourth hectare of NTAE crops; only the very few farmers with holdings or rental access to four or more

[1] For general socioeconomic descriptive information, see Asturias et al. 1999.

hectares planted more than a relatively small proportion of their total land area (Asturias de Barrios et al. 1999).

A random sample was selected from a larger probability sample drawn in 1999. The Impact Perception Survey sample comprised 87 individuals from 44 households: 43 male household heads and 44 female household heads. Average age was 40 (sd 14). Ethnically, the sample self-identified as 79% Kaqchikel; 15% Ladino; and 6% mixed; 92% were native to the community. Most people were Roman Catholic (55%) and a sizeable minority were Evangelical (40%). Most individuals had completed less than four years of primary school; only 3% had more than primary education.

Among men, 50% reported farming as their primary occupation; the remainder reported service (36%) and industrial occupations (10%). Despite San Mateo's location near Antigua Guatemala and within one hour of the capital, most male nonagricultural employment was locally-based. Among men, 29% reported farming as their secondary occupation. Among women, 55% reported farming as their first or second occupation (excluding agricultural laborers); 14% reported running commercial enterprises locally or in Antigua or the capital.

During the July 1999- August 2000 cycle 45% of individuals and 54% of households planted nontraditionals, most planting two or three cultigens. Of the 44 households, 41% planted snow peas; 27% planted zucchini, and 50% planted French beans. Most producers reported selling all of these crops through a cooperative; some reported selling through a cooperative and through intermediaries; and a few reported selling only through intermediaries or to agroexporters. (The survey did not ask producers to name the cooperative through which they sold. Although the Quatro Pinos cooperative had experienced financial difficulties during the previous two years, most producers apparently continued doing business through Quatro Pinos).

When asked to give their production histories for these crops, 77% of households reported having produced snow peas at some time before 1999; 59% had grown zucchini; and 70% had produced French beans.

Global Perceptions of Family Economic Trajectory 1980-2000

All respondents answered a global question concerning the economic trajectory of their families over the past twenty years, the period of time during which nontraditionals have been grown in the community. Respondents were asked if their economic situation were better, the same, or worse than before NTAEs were planted in the community. If they answered "better," they were asked if they were much better off than before the arrival of NTAEs. If they answered "worse," they were asked if they were much worse off than before NTAEs arrived. Even relatively young household heads answered this question--referring to their families of origin rather than their families of procreation. Responses of household heads did not differ among those who formed their families before the advent of NTAEs and those who had formed their families in the last 20 years (sig. T, 2-tailed = .584). Responses are summarized in Table 1.

TABLE 1

Considering the community as a whole, 42% of people felt they were better off than before nontraditionals came to the community and slightly more felt that their economic situation had not changed. Given the small proportion of people who felt they had lost ground since NTAEs arrived, the overall perception of economic change was positive. This question, of course, did not require respondents to attribute economic change to NTAE production.

NTAE Producers Perceive Positive Economic Change

Subsamples of current and former producers of NTAEs were asked to evaluate change in their families' fortunes during the entire period they produced the crops. The response of current

NTAE producers was strongly positive concerning perceived economic change for their families over the duration of time during which they had produced NTAEs (Table 2).

TABLE 2

As they looked back over their production histories, two-thirds of current NTAE producers felt that their families' economic situation had improved. Most of the remainder felt that there had been little change. Even among individuals who no longer produced NTAEs, the majority felt they were better off or the same as before they began to produce these crops (Table 3).

TABLE 3

Positive Perceptions of Individual Crops as Income-earning Strategies

Both current and former producers of NTAEs reported perceptions of whether producing each crop had been a good strategy for maintaining a family (although most who answered were current producers). Seventy-four percent of snow pea producers, 82% of French bean growers, and 67% of zucchini growers concluded that producing these crops provided a good livelihood strategy. Considering the aforementioned risks associated with small-scale production of NTAEs and the small amounts planted, these proportions were remarkably positive.

Perceptions of Capital Constraints and the Sustainability of Economic Growth through NTAE Production

Current and past producers were asked to name three things that would enable them to make more money from NTAE production. The survey instrument provided cues: "For example, do you need more land? Credit? Irrigation? Labor? Market access? Improved yields? Better product quality?" Most respondents stated that their most pressing need was credit or other sources of money to invest in production; more land was the second greatest need. Additionally, several farmers replied that better product quality, higher yield, better prices, and new products

or market outlets would help—all of which could be expected to contribute funds for continued investment in NTAEs. Among former producers, 57% said they would not return to NTAE production, 25% said they might return, and 18% said they planned to return to production. Of those who said they would not return to production, one-fourth are elderly and no longer work; one-fourth do not have family labor; and the remainder cited lack of profitability and fluctuating prices as the basis for their withdrawal from the market. Those who expected to return to production cited the same needs for improved economic returns as current producers.

Findings from San Mateo were inconclusive regarding the effects of NTAE production on transfers of land. Intergenerational inheritance within families was the primary transfer mechanism rather than sales within the community and respondents did not consider the effect of NTAE production on land that had been bequeathed. Respondents did not report having been squeezed out of the limited local land market because of some NTAE producers' greater ability to purchase land or their own inability to adopt NTAEs.

High Rates of Employment in NTAEs

Non-traditionals provided considerable employment in San Mateo. Among all members of the community, 61% said that at least one person in their families had worked in NTAE production during the previous five years. On average, three family members had worked in NTAE production in these families. Taking the sample as a whole, an average of 1.84 family members had worked in family NTAE fields during the preceding five years. Wage work in the NTAE fields had provided employment for 26% of families and a total of 39 individuals. Non-farm work related to NTAEs also provided employment for many families. Eighteen percent of household heads had worked in packing plants or in the commercialization or transportation of

NTAEs. Including all family members, 28 individuals had worked in packing plants; 6 commercialized crops; and 2 worked in transportation.

Agriculture Viewed as the Best Way to Make a Living in San Mateo

Respondents were asked to list the best livelihood strategies (ways to make a living) for people in San Mateo. First, respondents listed all of the strategies they considered among the best. Agriculture was listed by 38% of respondents, followed by construction (20%), factory work (8%); commerce and store keeping (11%); and NTAEs (8%). Then respondents were asked to rank the best source from their list. Agriculture topped the list for one-fourth of respondents, followed by construction (one-fifth); other sources appeared in the same order as on the first list. It is not clear how the separate listing of NTAEs should be interpreted, given the high proportion of households that produce NTAEs and the number of people employed in both on-farm and off-farm NTAE production. Given the diversified production strategies followed by most farmers, it is likely that most considered NTAE production to be part of their overall agricultural production.

Differences Between Producers and Non-Producers of NTAEs on Global Measure of Economic Change

Several statistical tests were performed to determine whether there were statistically significant differences in the perceptions of family economic change trajectories among current producers, former producers, and people who had never produced NTAEs. The independent variable in these tests was a three-point ordinal scale on which degree of NTAE involvement was ranked: 0 = never produced NTAEs; 1 = former producer; and 2 = current producer. The dependent variable for all tests was a five-point ordinal scale ranking the individual's perception of own family's current economic well-being compared with the time period before NTAE

production was adopted in the community (1980). The ranking on the perceived family economic trajectory scale was: 1 = much worse; 2 = worse; 3 = about the same; 4 = better; 5 = much better. None of the tests found a significant difference among groups: Analysis of Variance test (F = .494; p = .612); Gamma (.155; p = .312); Spearman Correlation (.111; p = .315). Although the logic of ranking involvement in NTAE production was compelling, tests that did not interpret the independent variable grouping as a ranked measure were also performed. Tests based on the Chi-Square distribution were compromised by the high proportion of cells with counts under 5 (an artifact of the small sample size); however, the Phi test was reliably calculated and also proved nonsignificant (.389; p = .121).

Plausible interpretations of this finding include: (1) farmers self-insured by planting a diversity of crops for export markets, domestic markets, and family consumption; (2) NTAE production did not differ greatly from other livelihood strategies in providing economic and other benefits for producers; and (3) more generalized economic and social improvement or deterioration accompanied rising and falling NTAE production returns for producers and nonproducers alike, in part because of incomes generated through NTAE production for service providers, field workers, and others whose income bases were improved through the presence of NTAE production in the community.

Information collected earlier in San Mateo supported the first interpretation. Most families were found to diversify livelihood strategies; those who planted NTAEs generally relied on other sources of income, as well (Asturias et al. 1999). Small-scale planters diversified their economic portfolios to reduce shocks from crop losses faced without crop insurance; price fluctuations; product rejection owing to sanitary and phytosanitary violations at port of entry; marketing bottlenecks; scarce and expensive credit received without any form of loan insurance;

and rising costs for inputs. Although most producers stated that they practiced integrated pest management and some pre-inspection protocols were made available through Quatro Pinos, it appeared that additional transference and institutionalization of production management practices and producer training would be necessary to enable small-scale farmers to significantly reduce crop losses and product rejections. As noted earlier, most NTAE producers in San Mateo continued to plant relatively small amounts of NTAEs. As perceptions of employment attested, the third interpretation was also probable.

Even though most families relied on a diversified portfolio of livelihood strategies, there was one subsample in which differences among producers and nonproducers do emerge: male household heads (Table 4). Among men, the degree of involvement in NTAE production was positively and significantly associated with a positive family economic trajectory. Among women, there was no significant difference across degrees of involvement in NTAE production in perceptions of the direction of family economic change.

TABLE 4

This finding may reflect the tendency to market primarily through the cooperative, whose membership was predominantly male. Disaggregating the data simply by gender (without factoring in involvement in NTAE production) showed that there were no differences among San Mateo men and women concerning the degree to which their families were perceived to be better or worse off than before NTAE production began in the community (Gamma = .038; .833; X^2 = 5.436, p = .245; t = -.357, p = .722).

Positive Social Change

Respondents also provided information concerning perceived changes in quality of life, including housing, education, nutrition, and health care in their families. Changes had been overwhelmingly positive in San Mateo. Two-thirds of people said they had improved the quality of their housing since 1980 and 42% of NTAE producers said they had used money from production to improve their housing. Eighty-four percent said that children stayed in school longer now than before NTAEs came to the community and 72% of NTAE producers had used money from production to pay for their children's education. Ninety-eight percent said they had greater ability to transport themselves than before NTAEs came to the community, either through purchase or rental of a vehicle or paying for transportation. Among female respondents, changes in family nutrition and health care were also reported to be positive. Two-thirds of women reported improved diet for their families and 56% said that money from NTAEs had helped them to improve family diet. Three-fourths of women reported that their families were better able to access health care (to visit a physician, nurse, or dispensary) than before NTAEs were produced in the community.

Conclusion

These results show that, in the community as a whole, the period of NTAE production was generally associated with an improved or stable family economic situation and with dramatically improved quality of life. NTAE production was perceived as a good way to make a living. Current producers considered themselves to be better off economically than before they began NTAE production. NTAE production provided considerable employment in the community. Most producers indicated that, if they had greater liquidity and a larger land base, they could produce more than their current output. NTAE production appears to offer potential

for sustainable economic growth and improvements in social and economic well-being in the community. In order for this growth to be realized, public and private development institutions should target investment to delivery of sustainable programs in integrated pest management, production credit, insurance, land access, and marketing assistance. The research reported here indicates that such investment would support sustainable agricultural and rural development.

References Cited

Arbona, Sonia I. 1998. Commercial Agriculture and Agrochemicals in Almolonga, Guatemala. The Geographical Review 88 (1): 47-63.

Asturias de Barrios, Linda and Brenda Tevalán. 1996. Producción Agrícola en Santa Maria Cauqué. Guatemala: Asociación de Investigación y Estudios Sociales (ASIES).

Asturias de Barrios, Linda et al. Economic and Socioeconomic Impact Assessment of Non-Traditional Crop Production Strategies in Small Farm Households in Guatemala. 1999. Sixth Annual Report of the Integrated Pest Management Collaborative Research Support Program (IPM CRSP). Blacksburg, VA: IPM CRSP.

Barham, Bradford L., Stephen Boucher and Michael R. Carter. 1996. Credit Constraints, Credit Unions, and Small-Scale Producers in Guatemala. World Development 24 (5): 793-806.

Barham, Bradford L., Michael R. Carter and Wayne Sigelko. 1995. Agro-export production and peasant land access: Examining the dynamic between adoption and accumulation. Journal of Development Economics 46: 85-107.

Bebbington, Anthony. 1999. Social Capital, Development, and Access to Resources in Highland Ecuador. Economic Geography 75 (4): 395-412.

Carletto, Calogero, Alain de Janvry and Elizabeth Sadoulet. 1999. Sustainability in the Diffusion of Innovations: Smallholder Nontraditional Agro-Exports in Guatemala. Economic Development and Cultural Change. 47 (2): 345-369.

Carter, Michael R. and Bradford L. Barham. 1996. Level Playing Fields and *Laissez Faire*: Postliberal Development Strategy in Inegalitarian Agrarian Economies. World Development 24 (7): 1133-1149.

Carter, Michael R., Bradford L. Barham and Dina Mesbah. 1996. Agricultural Export Booms and the Rural Poor in Chile, Guatemala, and Paraguay. Latin American Research Review 31 (1): 33-65.

Carter, Michael R. and Jonathan Coles. 1998. Inequality-Reducing Growth in Agriculture: A Market-Friendly Policy Agenda. In Beyond Tradeoffs: Market Reforms and Equitable Growth in Latin America. Nancy Birdsall, Carol Graham, and Richard H. Sabot, Eds. pp. 147-182. Washington, D.C.: Inter-American Development Bank, Brookings Institution Press.

Conroy, Michael E., Douglas L. Murray and Peter M. Rosset. 1996. A Cautionary Tale: Failed U.S. Development Policy in Central America. Boulder CO: Lynne Reinner Publishers.

Fischer, Edward. 2001. Cultural Logics and Global Economies: Maya Identity in Thought and Practice. Austin TX: University of Texas Press.

Fox, Jonathan. 1966. How Does Civil Society Thicken? The Political Construction of Social Capital in Rural Mexico. World Development 24 (6): 1089 – 1103.

Hamilton, Sarah. 1998. The Two-Headed Household: Gender and Rural Development in the Ecuadorean Andes. Pittsburgh: University of Pittsburgh Press.

Hamilton, Sarah. 2000. Blood, Sweat, and Tears: Gender and Entitlement to Land in Ecuador, Guatemala, and Mexico. Presented at the Latin American Studies Association XXII International Congress, Miami, March 16-18.

Hamilton, Sarah, Linda Asturias de Barrios, and Brenda Tevalán. 1999. Tradition and Nontradition: Gender-based Market Disruption in Ecuador and Guatemala. Paper presented at the Society for Applied Anthropology Annual Meetings, Tucson, April 20-25.

Hamilton, Sarah, Glenn Sullivan, Linda Asturias and Guillermo Sánchez. Economic and Socioeconomic Impact Assessment of Non-traditional Crop Production Strategies on Small Farm Households in Guatemala. 2000. Seventh Annual Report of the Integrated Pest Management Collaborative Research Support Program (IPM CRSP). Pp. 138- 143. Blacksburg, VA: IPM CRSP.

Immink, Maarten D. C. and Jorge A. Alarcon. 1993. Household Income, Food Availability, and Commercial Crop Production by Smallholder Farmers in the Western Highlands of Guatemala. Economic Development and Cultural Change. 4 (1): 319 – 343.

Julian, James W., Glenn H. Sullivan and Guillermo E. Sánchez. 2000. Future Market Development Issues Impacting Central America's Nontraditional Agricultural Export Sector: Guatemala Case Study. American Journal of Agricultural Economics 82(5): 1177-1183.

Katz, Elizabeth G. 2000. Social Capital and Natural Capital: A Comparative Analysis of Land Tenure and Natural Resource Management in Guatemala. Land Economics 76 (1): 114-132.

Murray, Douglas L. and Peter Leigh Taylor. 2000. Claim No Easy Victories: Evaluating the Pesticide Industry's Global Safe Use Campaign. World Development 28 (10): 1735-1749.

Pretty, Jules and Hugh Ward. 2001. Social Capital and the Environment. World Development 29 (2): 209-227.

Sullivan, Glenn, Guillermo E. Sánchez, Stephen C. Weller and C. Richard Edwards. 1999. Sustainable Development in Central America's Non-Traditional Export Crops Sector through Adoption of Integrated Pest Management Practices: Guatemalan Case Study. Sustainable Development International 1: 123-126.

Thrupp, Lori Ann, with Gilles Bergeron and William F. Waters. 1995. Bittersweet Harvests for Global Supermarkets: Challenges in Latin America's Agricultural Export Boom. World Resources Institute.

Uphoff, Norman and C. M. Wijayaratna. 2000. Demonstrated Benefits from Social Capital: The Productivity of Farmer Organizations in Gal Oya, Sri Lanka. World Development 28 (11): 1875-1890.

von Braun, Joachim, David Hotchkiss, and Maarten Immink. 1989. Nontraditional Export Crops in Guatemala: Effects on Production, Income, and Nutrition. Research Report 73. Washington, D.C.: IFPRI.

Tables

Table 1. Perception of Family Economic Trajectory Following the Introduction of Nontraditional Export Crops into Community (1980-2000), San Mateo Milpas Altas, N = 84

Economic situation is: Much better	5	6%
Better	30	36%
The same	38	45%
Worse	10	12%
Much worse *Than before NTAEs*	1	1%
Sum	*84*	*100%*

Table 2. Current NTAE Producers' Perception of Total Family Economic Trajectory During NTAE Production, San Mateo Milpas Altas, N = 39 Current Growers

Much better	1	3%
Better	25	64%
The same	9	23%
Worse	4	10%
Much worse *Sum*	*39*	*100%*

Table 3. Former NTAE Producers' Perception of Total Family Economic Trajectory During NTAE Production, San Mateo Milpas Altas, N = 22 Former Producers

Much better		
Better	5	23%
The same	13	59%
Worse	1	4%
Much worse	3	14%
Sum	*22*	*100%*

Table 4: Perceived Family Economic Trajectory on Global Measure (1980-2000) by Degree of Involvement in NTAE Production by Gender					
		Never Produced NTAEs	Former Producer	Current Producer	*Total*
	Perceived Family Economic Trajectory				
Men	Much worse (value = 1)			1	*1*
	Worse (value = 2)	2	1		*3*
	About the same (value = 3)	8	6	8	*22*
	Better (value = 4)	2	2	12	*16*
	Much better (value = 5)		1		*1*
	Totals	*12*	*10*	*21*	*43*
Statistics	Gamma = .478; p = .013 Spearman Correlation = .326; p = .023				
Women	Much worse (value = 1)	0	0	0	*0*
	Worse (value = 2)	2	1	4	*7*
	About the same (value = 3)	3	8	5	*16*
	Better (value = 4)	4	2	8	*14*
	Much better (value = 5)	3		1	*4*
	Totals	*12*	*11*	*18*	*41*
Statistics	Gamma = -.122; p = .586				
	Spearman Correlation = -.100; p = .532				